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EFFECT OF THE PROTOZOAN PARASITE,  
MYXOSOMA HETEROSPORA ON THE EYE  
OF THE FISH TILAPIA NILOTICA

(With One Table & 4 Fig.)

By

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(Received at 21/4/1994)

**تأثير طفيل ميكروسوما هيتيروسبورا على عين  
سمكة التيلابيا نيلوتিকা**

نوال عبد السمیع مازن

تم فحص أسماك البلطى للاصابه بطفيلى الميكروسبوريديا بالأخص التى تصيب العين والخياشيم .  
ولقد وجدت الاصابه بالأكياس فى القرنيه بأحجام ترى بالعين المجرده وتمت دراسة هذا النوع من حيث تأثيره على القرنيه - وتم التعرف على جنسه ونوعه - ووجد أنه لأول مره يكتشف هذا الطفيل فى عيون سمك البلطى فى مصر وتأثيره على العين - وقد قامت الباحثة بتصوير العين وقطاعات فى القرنيه لظهار الاكياس وأيضاً رسم وتصوير الطفيل .

# EFFECT OF MYXOSOMA HETEROSPORA ON EYE OF TILABIA NILOTICA

## SUMMARY

On reviewing the Egyptian literature on the prevalence of Myxosporidia in our fishes, it is clear that most our fishes are infected with one or more species of this protozoan parasite. The present study is a discovery of the cysts of the parasite in the cornea of an Egyptian fish. The effect of *Myxosoma heterospora* on the eye with special reference to the cornea has been mentioned in the text.

**Keywords:** *Myxosoma heterospora*, eye of *Tilapia nilotica*.

## INTRODUCTION

Fishes represent a source of animal protein and in some countries the fishes constitute the main food stuff beside other nutritional substances.

Many of parasitic protozoa are pathogenic to fishes. In severe infection, these protozoa can cause weight loss, and even perishing of such fishes, and some fish must be discarded because they are unmarkatable and not fit for human consumption (EL-MAFFAR, 1970).

Myxosporidia are widely distributed among fresh water fishes and they may be the cause of their diseases (FAHMY; et al. (1971). KUDO (1966) stated that Myxosporidia is divided into two suborders on the basis of the shape and structure of the spores, Unipolarina and BIPOLARINA TRIPATHI, 1948.

Human beings may consume under-cooked fishes containing living myxosporidian parasites. They might be exposed to unknown dangers of these parasites.

The aim of the present work is to make a survey on myxosporidian parasites of fresh water fishes at Assiut city with special reference to those infecting the eyes and gills.

## MATERIAL and METHODS

Fishes were examined macroscopically and microscopically for myxosporidia with special reference to the eyes and gills. The material was collected from 40 out of one hundred fish captured from the River Nile at Assiut city. Macroscopic cysts were dissected out and some were squashed between two slides to prepare smears of the spores, others were crushed in normal saline solution for further investigations. Some cysts were

fixed either in 10% formol saline or in Bouin's fluid. The same fixatives were used for tissues containing the parasite. The cysts or tissues were then subjected to the usual histological procedures.

Leishman or Giemsa's stained smears were prepared from spores collected by squashing the cysts or tissues. Polar filaments were extruded by treating living spores with 5% potassium hydroxide or saturated urea solution. They were measured when fully extruded.

The eyes were fixed in formal-alcohol, Paraffin sections were made and stained with Haematoxylin and Eosin to show the effect of parasites on the eye tissues.

Photomicrographs of stained sections in the cysts in relation to the cornea, as well as the spores were illustrated. Camera lucida drawings of the spores with its contents were also made and illustrated (Fig. 4).

## RESULTS

### **Myxosoma heterospora:**

The present parasite was found as cysts and spores in the fish *Tilapia nilotica*. The cysts were found infecting the gills and eyes. The spores were detected in the eye muscles, kidney, liver and spleen. Forty out of hundred fish examined (40%) were infected with the present parasite.

One to 15 cysts were observed in the eye and one to three cysts were observed in the gills. The cysts are rounded, oval or elongated in shape (Fig.1), white in colour, measuring 0.50 - 2mm x 0.30 - 1.30mm. (Table 1).

The spore is oval to elliptical in shape with slightly pointed anterior end and rounded posterior one. It measures 14-18 x 8-11  $\mu\text{m}$ . The ratio of spore length/spore width is 1.7-1.8. It contains 2 ovoid polar capsules. They are equal in size, each measures 4-6 x 2-4 -3.8 $\mu\text{m}$ . The ratio of polar capsule length/spore length is about 0.30. Each polar capsule containing a coiled polar filament when extruded they are 38-54 $\mu\text{m}$  in length. The sporoplasm is coarsely granulated. Two nuclei are clearly visible in the sporoplasm of some stained spores, each is about 2  $\mu\text{m}$  in diameter. No iodophilous vacuole is observed (Fig. 2).

Haematoxylin and Eosin stained sections (Fig. 3) showed that the cyst is composed of an outer thin layer of tightly packed epithelial cells embedded in adipose host tissue. The inner layer consists of macrocytes at the periphery, the fully developed spores are present inwards.

The species causes pronounced exophthalmos of the eye and opacity of the cornea.

Histopathology: No reaction was detected around the cysts. The presence of cyst in the cornea may affect the vision of fish or may even lead to blindness.

### DISCUSSION

The parasite under discussion is related to the genus *Myxosoma* THELOHAN 1892, family Myxosomatidae POCHE, 1913.

*Myxosoma heterospora* type (i) was first described by BAKER, 1963 from the viscera and spleen of *Tilapia esculenta*, *Tilapia variabilis* and *Tilapia nilotica* of lake Victoria in Uganda.

FAHMY *et al.* 1975 described the spores of this parasite from the spleen and kidney of *Tilapia nilotica* at River Nile of Assiut. They found that the percentage of infection was 50%, the spore length was 9-13 $\mu$ m and the polar filaments measured 30-36 $\mu$ m. (Table 1).

MARWAN, 1980 described the spores of the present parasite from *Tilapia nilotica* at Assiut Governorate. The incidence was 25.95%, the spore length was 15.84-18 $\mu$ m and the polar filament was 21.5-44 $\mu$ m. (Table 1).

ABED, 1987 described the cyst of this parasite from the internal surface of the operculum and the periorbital tissue around the eye, and the spores from muscles, eye, kidney, liver and spleen of *Tilapia nilotica*. The incidence was 75%, the spore length was 15.19-17.82 $\mu$ m and the polar filament was 35-49 $\mu$ m. The same author was the first who described the cyst and the structure of the cyst wall of the present parasite. (Table 1).

Myxosporidiosis of the eye was studied by DOGIEL *et al.* (1949). from *Myxobolus talievi* and *Myxobolus spatulatus* and causes pronounced exophthalmos and blindness of the cottid fish in Baykal. However, *Myxobolus magnus* AVERINTZIN, 1913 and *Myxobolus schizura* which were found in the eye did not cause noticeable pathological changes. No reaction was detected around the cysts. The presence of cysts in the cornea may affect the vision of the fish or may even lead to blindness.

It is worthwhile mentioning here that it is the first time to discover *Myxosoma heterospora* infecting the cornea of fishes in Egypt.

ACKNOWLEDGEMENTS

I do not forget the help and advice offered by late Prof. Dr. M.K. El-Naffar.

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EFFECT OF MYXOSOMA HETEROSPORA ON EYE OF TILABIA NILOTICA

Table 1: Comparison between the present and previous study on Myxosoma heterospora.  
All measurements are in micron unless otherwise stated.

	Baker, 1963 specimen	Fahmy et al., 1971 specimen	Harvan, 1980 specimen	Afied, 1997 specimen	The present material
Spore: Length	8.5-17	9-13	15.84-18	15.19-17.82	14-18
width	6.5-11	6.5-8.5	7.2-10.4	9.8-11.80	8-11
polar cap. length	2-5.5	3.42-4.44	4.76-6.48	4.28-5.63	4-6
polar cap. width	1.5-3.5	3.2-3.8	2.4-4	2.80-3.64	2.4-3.8
Ratio of polar cap/spore length	-	0.33	0.34	0.30	0.30
polar filament	not mentioned	30-36	21.5-44	35-44	38-54
% of infection	not mentioned	50%	25.95%	75%	40%
Habitat	viscera and spleen	Spleen and Kidney	Kidney	eye, muscle, kidney, liver and spleen	Eye and gills
Cyst: size	-	-	-	0.50-1.85x0.35mm - 1.25 mm	0.50-2 mm. x 0.30-1.30 mm.
Pathit	-	-	-	in periorbital tissue	eye and gills
Locality	Lake Victoria in Uganda	Assiut, Egypt	Assiut, Egypt	Assiut, Egypt	Assiut, Egypt
Host	<u>Tilapia esculenta</u>	<u>Tilapia nilotica</u>	<u>Tilapia nilotica</u>	<u>Tilapia nilotica</u>	<u>Tilapia nilotica</u>

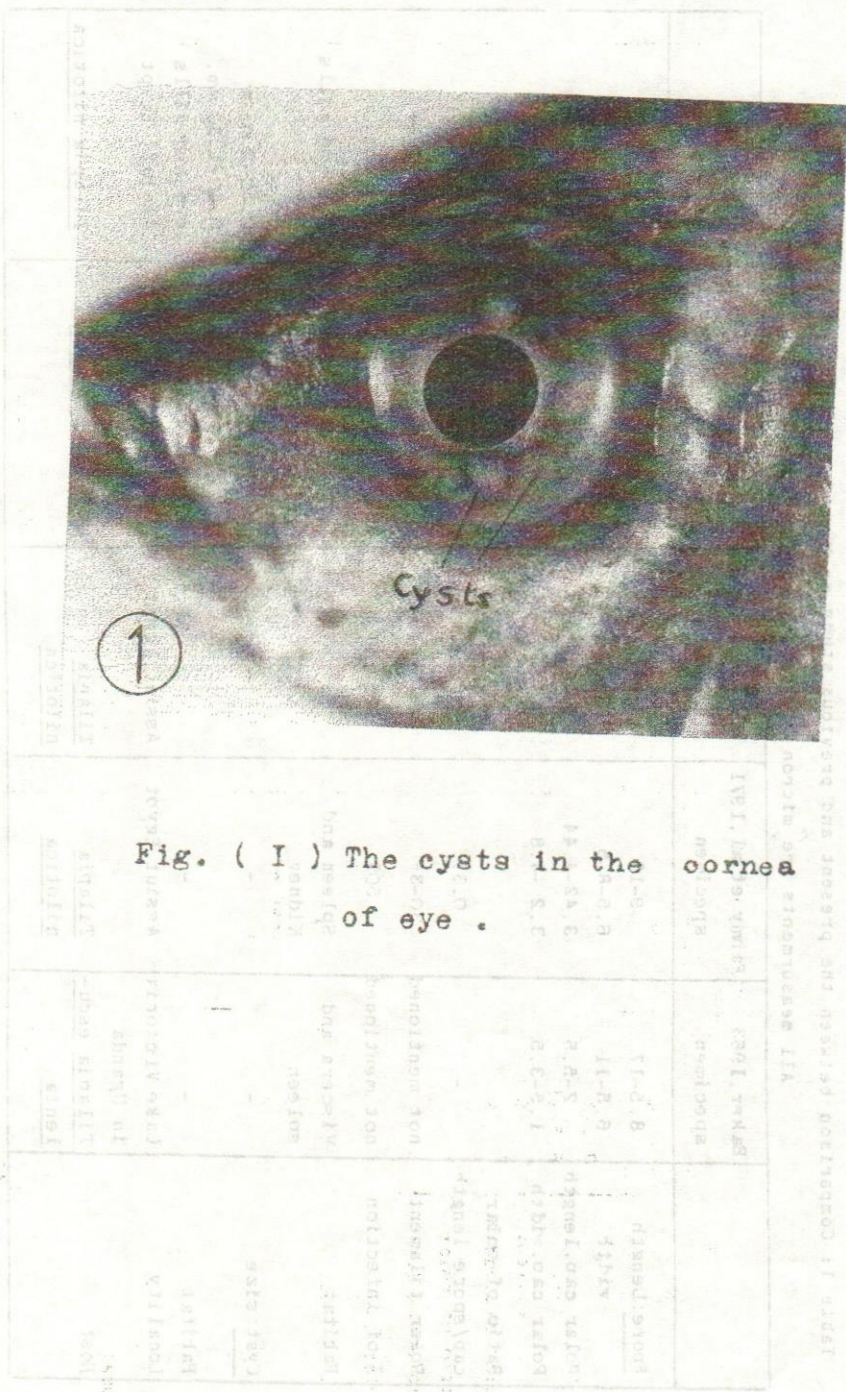


Fig. ( I ) The cysts in the cornea of eye .

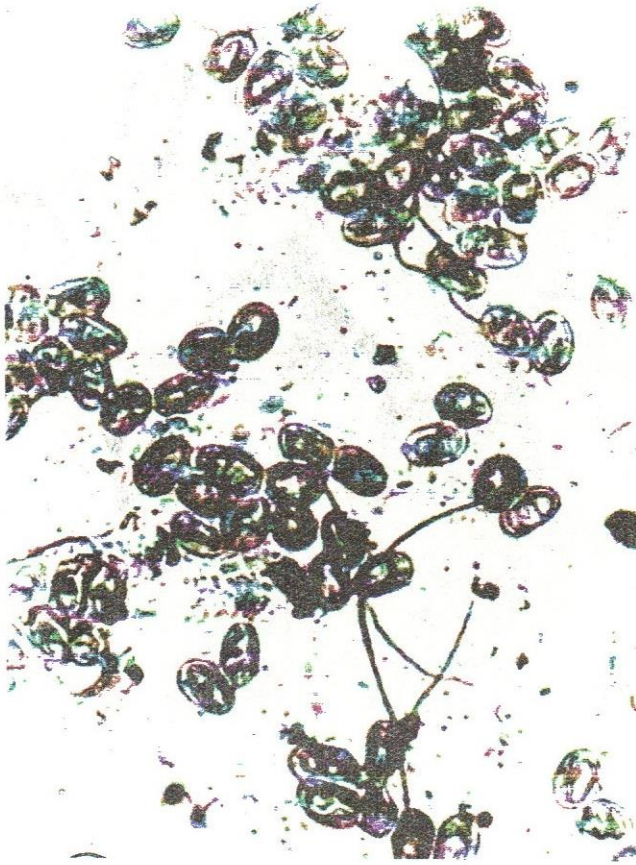


Fig. ( 2 ) Section in the  
cyst stained by Leishman.



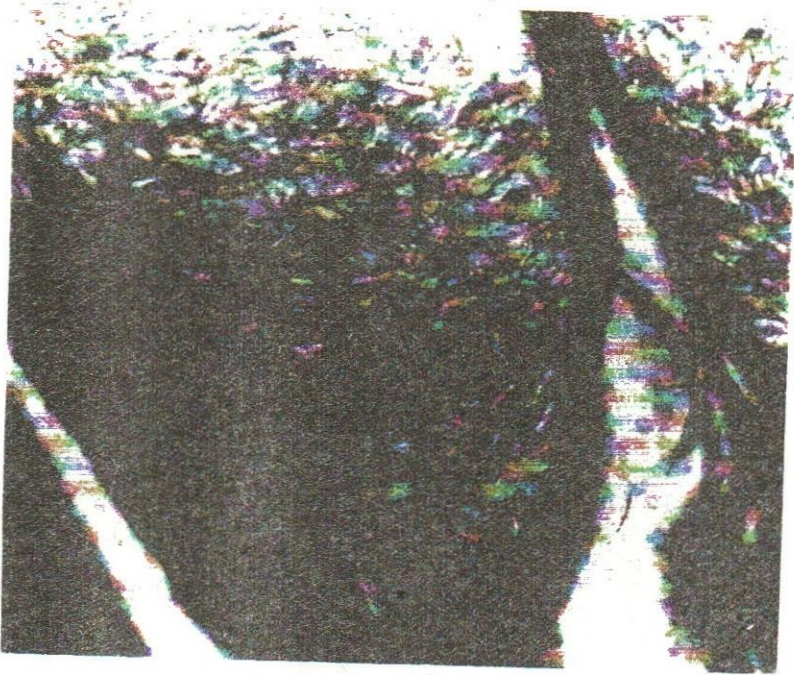
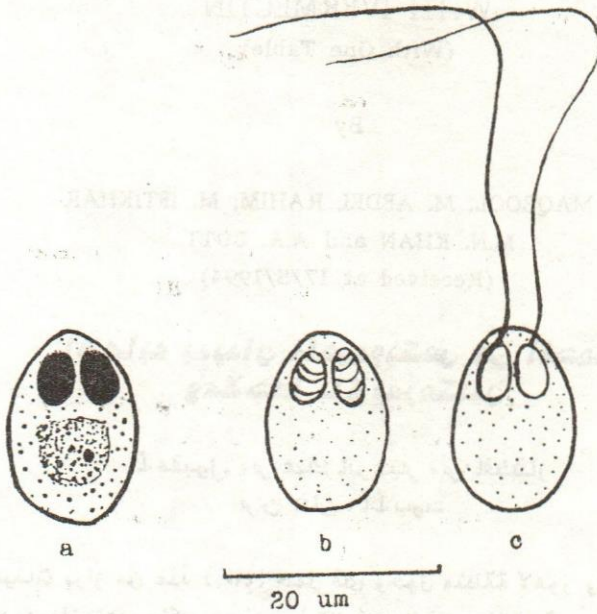


Fig. ( 3 ) Section in the eye stained by  
haematoxylin and eosin .



( Fig. 4 ) Spores of Myxosoma heterospora from the eye of Tilapia nilotica

- a- Stained spore
- b- Spore with coiled polar filaments .
- c- Spore with extruded polar filaments .

( Camera lucida drawing )